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POLICY TOOLS UNDER PRESSURE: HOW CENTRAL BANKS RESPOND TO FINANCIAL RISK FROM ALLIANCE SHIFTS AND GLOBAL TRADE VOLATILITY

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ABSTRACT

This study investigates how central banks across 35 advanced and emerging economies adjust their monetary policy instruments in response to evolving financial risks arising from shifting geopolitical alliances and global trade volatility between 2010 and 2023. Employing advanced panel econometric techniques, including System Generalised Method of Moments (System GMM), this paper quantifies the dynamic effects of geopolitical risk (GPR) and global trade uncertainty (GTUI) indices on policy interest rates. The findings reveal that both GPR and GTUI exert significant tightening pressure on monetary policy, with emerging markets displaying heightened sensitivity compared to advanced economies. Robustness checks confirm the stability of these results across alternative model specifications and subsamples. Further analysis using impulse-response functions demonstrates the temporal dynamics of policy rate adjustments following shocks to geopolitical risk. The study contributes to the literature by integrating multidimensional global risk measures into the evaluation of central bank behaviour, providing critical insights for policymakers navigating complex international financial environments characterised by alliance shifts and trade disruptions.

Keywords: Central banks, emerging markets, geopolitical risk, global trade uncertainty, monetary policy

INTRODUCTION

Over the past decade, the global economy has been increasingly shaped by geopolitical realignments, trade disruptions, and mounting systemic uncertainties (Caldara & Iacoviello, 2022). Central banks, traditionally tasked with maintaining domestic macroeconomic stability, now operate in an increasingly complex and unpredictable global environment (IMF, 2023). Shifts in strategic alliances, regional conflicts, and rising protectionism have added new layers of risk to the financial systems of both developed and emerging economies. These phenomena have not only redefined global capital flows and investment patterns but have also complicated the implementation and effectiveness of conventional monetary policy instruments (Borio, 2022 ; Bank, 2023).

The need to understand how central banks respond to such multifaceted challenges has never been more urgent. Recent years have witnessed an escalation in global uncertainties, driven by events such as Brexit, the U.S.-China trade war, the COVID-19 pandemic, and most recently, conflicts in Eastern Europe and the Middle East (Baldwin & Evenett, 2020). These shocks have increased the volatility of global markets and disrupted supply chains, foreign exchange dynamics, and interest rate expectations. In parallel, the economic repercussions of these events are no longer confined within national borders but are transmitted swiftly across regions, forcing central banks to reassess the robustness of their policy frameworks (International Money Fund, 2023).

The Global Trade Uncertainty Index (GTUI), developed by Ahir et al. (2019), provides empirical evidence of persistent and elevated levels of trade-related uncertainty since 2018, with multiple spikes corresponding to major geopolitical events. In the same vein, the Geopolitical Risk Index (GPR) introduced by Caldara and Iacoviello (2022) demonstrates how sudden surges in geopolitical tensions ranging from diplomatic standoffs to armed conflicts correlate with increased financial risk and reduced investor confidence. These indices serve as critical tools for quantifying the intensity and timing of external shocks, offering a valuable lens through which to assess monetary policy responses under pressure.

Despite growing recognition of these risks, the academic literature remains relatively underdeveloped in capturing the interplay between central bank policies and the evolving nature of global political and trade dynamics (Reinhart, 2022). While substantial work has been done on central banks' responses to traditional macroeconomic shocks such as inflation, unemployment, and financial crises (Bernanke, 2020; Galí & Monacelli, 2016), comparatively fewer studies address how geopolitical and trade uncertainty reshape the conditions under which monetary and macroprudential tools are deployed. Existing models tend to rely on assumptions of geopolitical stability, failing to consider the disruptive potential of alliance shifts or strategic decoupling among major economies (Aiyar et al., 2023).

Moreover, the transmission mechanisms of financial risks have grown more complex. For instance, an escalation in geopolitical tension can lead to currency depreciation, capital flight, and commodity price volatility, each of which demands different policy responses. In trade-sensitive economies, a spike in trade uncertainty may depress investment and output, rendering interest rate adjustments or quantitative easing less effective. Central banks must therefore adopt a more agile, context-sensitive approach to deploying their policy toolkit, incorporating non-economic variables into their decision-making.

This study seeks to fill this gap by examining how central banks adjust their policy responses amid heightened global trade uncertainty and geopolitical risk. Specifically, this study investigates whether, and to what extent, monetary policy instruments, including interest rates, exchange rate interventions,

and macroprudential regulations, respond to changes in the Global Trade Uncertainty Index (GTUI) and the Geopolitical Risk (GPR) Index across a panel of countries over the period 2010 to 2023. By integrating high-frequency data on geopolitical risk and trade uncertainty with macroeconomic indicators, this paper offers a novel framework for understanding central bank behaviour under exogenous shocks.

The objectives of this research are twofold. First, to empirically assess the sensitivity of central bank policy tools to rising levels of geopolitical and trade-related uncertainty using a dynamic panel regression model. Second, to evaluate the heterogeneity of policy responses across different economic contexts such as advanced economies versus emerging markets given their varying exposure and institutional resilience. It is hypothesised that central banks in emerging markets may exhibit greater sensitivity to external shocks due to higher capital mobility, dependence on trade, and weaker institutional buffers.

By contributing a data-driven analysis that combines geopolitical and trade uncertainty indices with real-world policy adjustments, this study offers both theoretical and practical insights. It enhances the existing literature on monetary policy under uncertainty and provides policymakers with evidence-based strategies to manage financial risks amid global instability. As the world continues to grapple with fragmented alliances and volatile trade relations, understanding the role of central banks in preserving economic stability becomes not only a scholarly concern but a global imperative.

LITERATURE REVIEW

Over the last decade, scholarly interest has increasingly focused on the intersection of monetary policy, trade volatility, and global political shifts. Conventional monetary policy frameworks traditionally prioritise macroeconomic fundamentals, such as inflation, employment levels, and output gaps as the key drivers of decision-making. However, the sufficiency of these standard approaches has been questioned by recent geopolitical realignments, trade fragmentation, and recurring global crises. Although an emerging body of research suggests that non-economic factors, including geopolitical risk and trade uncertainty, are increasingly critical to monetary policy, there is little consensus on the nature or extent of their impact (Caldara & Iacoviello, 2022). While some analyses indicate that rising geopolitical tension necessitates monetary tightening to control inflation and exchange-rate fluctuations, others argue that heightened uncertainty dampens aggregate demand and investment, favouring more accommodative policy stances. These conflicting perspectives underscore that the relationship between global uncertainty and monetary policy remains both theoretically and empirically unresolved.

Caldara and Iacoviello (2022) created the Geopolitical Risk Index (GRI) to measure tensions stemming from events like wars, terrorism, and diplomatic friction, subsequently investigating their impact on the macroeconomy. Their research suggests that increased geopolitical tension dampens economic activity by hindering trade and investment. Additionally, Borio contends that these tensions create a "policy pincer movement" for central banks, which must weigh the inflationary effects of supply disruptions against the financial instability triggered by capital flight. As a result, research often finds that central banks pivot toward precautionary tightening when faced with geopolitical shocks. Nevertheless, empirical findings are mixed, as the policy response typically depends on a country's economic openness and institutional strength. Furthermore, current literature largely examines geopolitical risk in isolation, frequently overlooking how it intersects with uncertainty surrounding trade (Reinhart, 2022).

Mirroring the evolution of research on geopolitical risks, the field of trade-related uncertainty has seen significant growth following the debut of the Global Trade Uncertainty Index (Ahir et al., 2019). This

index measures tensions such as protectionist strategies and tariff increases, which are associated with reduced capital investment, disrupted global value chains, and greater price instability. Empirical evidence indicates that monetary authorities may mitigate the demand-side consequences of trade uncertainty by calibrating interest rates to anchor market expectations. In emerging markets particularly dependent on trade, elevated uncertainty frequently triggers capital flight and currency volatility, necessitating robust policy intervention. Nevertheless, the literature regarding the monetary policy implications of such uncertainty remains divided; some research suggests more pronounced impacts within emerging economies, whereas other findings indicate a more consistent effect across nations. Moreover, despite the rising synergy between trade uncertainty and geopolitical risk in the modern global economy, there is a shortage of research exploring these two factors in tandem (Ahir et al., 2019).

Although geopolitical and trade risks are frequently examined in isolation, contemporary research emphasizes their inherent interdependence. The rise of geoeconomic fragmentation, fuelled by strategic decoupling between major powers, increases trade volatility and modifies the channels through which monetary policy influences the economy (Ahir et al., 2019). Both Borio and the World Bank contend that facing multiple concurrent shocks necessitates that central banks utilize broader policy frameworks capable of navigating cross-border spillovers, financial contagion, and non-linear risk transmission. However, systematic empirical studies regarding the cumulative impact of these variables on monetary policy are sparse, suggesting that the precise consequences for central bank strategy remain an open question.

Researchers studying how central banks react to global risks have employed a variety of econometric frameworks, spanning from Vector Autoregression models to dynamic panel techniques. The System Generalized Method of Moments, established by Blundell and Bond, has become a favoured approach for managing persistent policy variables and inherent endogeneity, particularly within datasets characterized by substantial cross-sections and limited time dimensions. As noted by Blundell and Bond (1998), GMM estimators provide robust inference when addressing country-specific heterogeneity and bidirectional causality between policy rates and uncertainty metrics. In contrast, traditional methods like standard panel regressions and VAR models may struggle to adequately handle dynamic endogeneity and unobserved heterogeneity, a limitation that can introduce bias into estimates of policy responses. Consequently, this methodological hurdle underscores the significance of utilizing System GMM to analyse the interplay between global risks and monetary policy (Arellano & Bover, 1995).

Despite these advancements, the scholarly literature still lacks a cohesive empirical framework for addressing geopolitical and trade-related uncertainty. The majority of existing research either isolates macroeconomic shocks or concentrates on single-country studies, frequently ignoring cross-country variations in policy responses. Furthermore, there is a dearth of models that utilize high-frequency, multidimensional risk indices to collectively assess the impact of trade and political shocks on monetary and macroprudential instruments. This void is notable, especially considering the escalating synchronization of global risks and their varied consequences for advanced and emerging economies. Consequently, there is a lack of empirical clarity regarding how central banks concurrently navigate geopolitical and trade-related uncertainties across different economic settings, representing a significant gap in the field.

This study addresses these gaps by utilizing a comprehensive panel dataset of 35 advanced and emerging economies covering the period from 2010 to 2023. By incorporating the Geopolitical Risk Index and the Global Trade Uncertainty Index into a System GMM framework, this research jointly analyses the impact of geopolitical and trade-related uncertainties on central bank policy, while controlling for

endogeneity and cross-country variations. Consequently, the study advances the existing literature by offering a comparative, multidimensional evaluation of how monetary authorities modify their policy instruments when facing concurrent geopolitical and trade shocks.

DATA AND METHODOLOGY

Data Description

This study employs an unbalanced panel dataset comprising 35 countries, both advanced and emerging economies, over the period 2010–2023. The selection of countries is based on data availability for monetary policy instruments, geopolitical risk indices, and macroeconomic control variables.

Table 1

List of 35 Countries in the Panel Dataset (2010–2023)

Advanced Economies	Emerging Market Economies
Australia	Argentina
Austria	Brazil
Belgium	Chile
Canada	China
Denmark	Colombia
Finland	India
France	Indonesia
Germany	Malaysia
Ireland	Mexico
Italy	Peru
Japan	Philippines
Netherlands	Russia
New Zealand	South Africa
Norway	Thailand
Singapore	
South Korea	
Spain	
Sweden	
Switzerland	
United Kingdom	
United States	

Source:

1. Geopolitical Risk Index (GPR): Developed by Caldara and Iacoviello (2022), obtained from the Federal Reserve Board.
2. Global Trade Uncertainty Index (GTUI): Created by Ahir, Bloom, and Furceri (2019), accessed via the IMF.
3. Monetary Policy Rate (MPR): Central bank policy interest rate, from the IMF's International Financial Statistics and national central bank sources.
4. Exchange Rate Volatility (ERV): Monthly standard deviation of nominal exchange rate returns, sourced from the Bank for International Settlements.
5. Macroprudential Policy Index (MPI): Derived from the IMF's Integrated Macroprudential Policy (iMaPP) database.
6. Control variables: GDP growth, inflation, and current account balance, retrieved from the World Bank's World Development Indicators (WDI).

All variables are transformed into quarterly frequency using interpolation techniques, where necessary. The data are adjusted for seasonality and converted into natural logarithmic form, except for rate-based indicators.

Table 2

The key variables used in the study, their definitions, and data sources

Variable	Description	Source
MPR	Monetary Policy Rate (e.g., central bank interest rate)	IMF, National Central Banks
GPR	Geopolitical Risk Index	Caldara & Iacoviello (2022), Federal Reserve Board
GTUI	Global Trade Uncertainty Index	Ahir, Bloom & Furceri (2019), IMF
ERV	Exchange Rate Volatility (standard deviation of monthly returns)	BIS
MPI	Macroprudential Policy Index	IMF (iMaPP Database)
GDPG	GDP Growth Rate	World Bank (WDI)
INF	Inflation Rate	World Bank (WDI)
CAB	Current Account Balance (% of GDP)	World Bank (WDI)
EM	Emerging Market Dummy Variable	Author's Classification based on IMF

Source:

1. Geopolitical Risk Index (GPR): From Caldara and Iacoviello (2022), obtained from the Federal Reserve Board.
2. Global Trade Uncertainty Index (GTUI): From Ahir, Bloom, and Furceri (2019), retrieved from the IMF database.
3. Monetary Policy Rate (MPR): Policy interest rates from central banks and the IMF.
4. Exchange Rate Volatility (ERV): Standard deviation of monthly exchange rate returns, from BIS.
5. Macroprudential Policy Index (MPI): Derived from the IMF's iMaPP database.
6. Control Variables: GDP growth, inflation, and current account balance from the World Bank (WDI).

Methodological Framework

Given the endogeneity concerns, persistence of dependent variables, and the dynamic nature of monetary policy responses, the System Generalized Method of Moments (System GMM) estimator developed by Blundell and Bond (1998) was adopted. This estimator is particularly suitable for panel datasets with short time dimensions (T) and large cross-sections (N) and for models where lagged dependent variables appear as regressors. The baseline empirical model is specified as follows:

$$MP_{it} = \alpha_0 + \alpha_1 MP_{it-1} + \beta_1 \cdot GPR_{it} + \beta_2 \cdot GTUI_{it} + \beta_3 \cdot X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

MP_{it} = Monetary policy stance in country i at time t (policy interest rate)

MP_{it-1} = Lagged policy rate

GPR_{it} = Geopolitical Risk Index

$GTUI_{it}$ = Global Trade Uncertainty Index

X_{it} = Vector of control variables (inflation, GDP growth, exchange rate volatility)

μ_i = Country fixed effect

λ_t = Time fixed effect

ε_{it} = Error term

The System GMM estimator constructs moment conditions using both the level and differenced equations, applying internal instruments (lags of the regressors) to address potential simultaneity bias and reverse causality. The estimator is robust to heteroskedasticity, autocorrelation, and unobserved heterogeneity (Arellano & Bover, 1995). To ensure the validity of the model, the following tests were performed:

1. Hansen test of overidentifying restrictions to assess instrument validity.
2. Arellano-Bond test for autocorrelation in the error terms (AR (1) and AR (2)).
3. Difference-in-Hansen test for instrument subsets.

Instrument proliferation poses a notable challenge in System GMM estimation, as it may undermine the Hansen test and result in the overfitting of endogenous variables. To address this, the instrument matrix was constrained by limiting the lag structure, thereby maintaining a parsimonious set of instruments. The validity and robustness of these instruments were subsequently verified using the Hansen and Difference-in-Hansen tests. Because significant global events such as the COVID-19 pandemic, geopolitical conflicts, and trade tensions took place during the sample period, potential structural breaks might influence parameter stability. To verify the robustness of the findings, the study conducted additional estimations using alternative subsamples, including specifications that excluded the post-COVID period. The consistency of these results indicates that our main findings are not driven by specific structural break episodes.

Focus of the Study

The primary focus of this study is to evaluate the responsiveness of central bank interest rate policy to geopolitical risk and trade uncertainty shocks. Specifically, we seek to:

1. Quantify the short-term and long-term effects of GPR and GTUI on the monetary policy stance.
2. Determine whether central banks in emerging markets exhibit greater sensitivity compared to those in advanced economies.
3. Explore the non-linear effects of extreme geopolitical or trade events (via interaction terms or threshold regressions).

To complement the baseline model, we further extend the analysis with interaction terms to capture conditional effects (Brambor et al., 2006):

$$MP_{it} = \alpha_0 + \alpha_1 MP_{it-1} + \beta_1 GPR_{it} + \beta_2 GTUI_{it} + \beta_3 (GPR_{it} \times EM_i) + \beta_4 (GTUI_{it} \times EM_i) + \beta_5 X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (2)$$

Where EM_i is a binary variable indicating whether country i is an emerging market economy. This specification allows us to examine whether the magnitude and direction of policy responses differ structurally across income classifications and institutional robustness.

RESULTS AND FINDINGS

This section reports the empirical outcomes derived from the dynamic panel data estimations using the two-step System GMM approach. The analysis focuses on how central banks adjust their monetary policy rates in response to geopolitical risk and trade uncertainty, with a particular emphasis on

differences between advanced and emerging economies. The results from the baseline model (Model 1) indicate that the lagged dependent variable the previous period's monetary policy rate (MPR_{it-1}) is highly significant and positive, confirming the persistence in central banks' policy adjustments. This reflects a gradualist approach commonly employed by monetary authorities to avoid market disruptions. Both the Geopolitical Risk Index (GPR) and the Global Trade Uncertainty Index (GTUI) show positive and statistically significant coefficients at the 1% level. This suggests that central banks tend to tighten monetary policy in periods of rising uncertainty, possibly as a precautionary measure to mitigate capital outflows, currency depreciation, or inflationary expectations triggered by external shocks.

In the extended specification (Model 2), interaction terms between the uncertainty indices and the emerging market dummy (EM_i) reveal significant heterogeneity. The GPR × EM term is positive and significant, indicating that emerging market central banks respond more aggressively to geopolitical shocks than their advanced economy peers. However, the GTUI × EM interaction term is statistically insignificant, suggesting that trade uncertainty may influence monetary policy more uniformly across economies, regardless of development status. Robustness checks using alternative uncertainty proxies (such as the Economic Policy Uncertainty Index), exclusion of outliers, and sub-sample analysis produce qualitatively similar results, supporting the robustness of the findings.

Diagnostic tests further validate the model. The Hansen J-test confirms the validity of instruments, and the Arellano-Bond AR(2) test does not detect second-order serial correlation in the error terms, satisfying key conditions for the consistency of the GMM estimator (Arellano & Bond, 1991). These findings underscore that in today's interconnected world, geopolitical tensions and global trade frictions exert tangible influence on domestic monetary policy. For emerging markets, in particular, these external shocks necessitate a more active and often pre-emptive monetary stance.

Table 3

System GMM Estimation Results for Central Bank Policy Response to Global Risk Indicators

Variable	Coefficient	Standard Error	t-Statistic	Significance
Lagged Monetary Policy Rate	0.78	0.05	15.60	***
Geopolitical Risk Index (GPR)	0.12	0.04	3.00	***
Global Trade Uncertainty Index (GTUI)	0.08	0.03	2.67	***
GPR × Emerging Market	0.10	0.05	2.00	**
GTUI × Emerging Market	0.03	0.04	0.75	
Inflation	0.15	0.07	2.14	**
GDP Growth	-0.05	0.02	-2.50	**
Exchange Rate Volatility	0.07	0.03	2.33	**

Notes: *** p < 0.01, ** p < 0.05, * p < 0.1. Estimation performed using System GMM (Blundell & Bond, 1998; Arellano & Bover, 1995). Validity of instruments confirmed via the Hansen J-test (Hansen, 1982). No second-order autocorrelation per the Arellano-Bond AR (2) test (Arellano & Bond, 1991).

Table 3 reports the baseline estimation results from the two-step System Generalized Method of Moments (System GMM) model, capturing the dynamic response of central bank monetary policy rates (MPR) to global risk indicators. The model controls for potential endogeneity and persistence in policy behaviour, with the Hansen J-test confirming the validity of instruments and the Arellano-Bond AR (2)

test rejecting the presence of second-order autocorrelation, thereby ensuring the robustness of the estimates.

The lagged policy rate (0.78, $p < 0.01$) is positive and highly significant, indicating strong monetary policy inertia. This suggests that central banks adjust their policy rates gradually over time rather than implementing abrupt changes, consistent with the gradualist approach commonly documented in the monetary policy literature (Blundell & Bond, 1998).

Turning to the core variables, both the Geopolitical Risk Index (GPR) (0.12, $p < 0.01$) and the Global Trade Uncertainty Index (GTUI) (0.08, $p < 0.01$) exert significant upward pressure on monetary policy rates. These results imply that central banks systematically tighten monetary policy in the face of rising geopolitical tensions and trade-related uncertainty. The tightening response is likely motivated by concerns over inflationary expectations, capital flight, and financial instability triggered by such exogenous shocks. Importantly, this finding affirms the view that non-economic sources of uncertainty have become central drivers of monetary policy in the contemporary global economy (Aiyar et al., 2023; Caldara & Iacoviello, 2022).

The interaction terms reveal heterogeneity across country groups. The coefficient on $GPR \times \text{Emerging Market}$ (0.10, $p < 0.05$) is positive and significant, indicating that emerging market central banks react more aggressively to geopolitical risk compared to advanced economies. This heightened sensitivity likely reflects structural vulnerabilities such as higher exposure to capital outflows, weaker institutional buffers, and greater dependence on external financing. In contrast, the $GTUI \times \text{Emerging Market}$ interaction (0.03, non-significant) suggests that responses to trade uncertainty are more uniform across advanced and emerging economies, highlighting the systemic and global nature of trade-related shocks.

Among the control variables, inflation (0.15, $p < 0.05$) significantly increases the policy rate, indicating that central banks remain committed to price stability even when external shocks dominate. GDP growth (-0.05, $p < 0.05$) enters with a negative and significant coefficient, suggesting that stronger economic performance allows for more accommodative monetary stances, whereas weaker growth prompts policy support. Exchange rate volatility (0.07, $p < 0.05$) is also positive and significant, reinforcing the view that central banks respond to currency instability with higher policy rates, particularly in economies vulnerable to speculative pressures and external shocks.

Overall, the results in Table 3 provide compelling evidence that central banks adapt their monetary frameworks in response to multidimensional global risks. The findings highlight three key insights: (i) monetary policy exhibits persistence, reflecting gradual adjustment strategies; (ii) both geopolitical and trade-related risks are significant drivers of tightening; and (iii) emerging markets face disproportionate pressures from geopolitical risks relative to their advanced counterparts. Collectively, these results underscore the necessity for flexible and resilient monetary policy frameworks that integrate global uncertainty into decision-making processes.

Table 4 presents a series of robustness checks designed to validate the stability and reliability of the baseline findings. The use of multiple model specifications and subsample adjustments ensures that the estimated impacts of geopolitical risk (GPR) and global trade uncertainty (GTUI) on monetary policy rates are not artifacts of model choice, extreme observations, or sample-specific dynamics. Overall, the consistency of positive, statistically significant coefficients across specifications reinforces the credibility of the central conclusion that heightened global risks systematically induce central banks to tighten monetary policy.

Table 4

Robustness Checks: Alternative Specifications and Subsamples

Specification	Coefficient on GPR	Coefficient on GTUI	No. of Observations	Method Used
Baseline System GMM	0.12***	0.08***	420	System GMM
Fixed Effects Model	0.10**	0.06**	420	Fixed Effects
Dropping High-Volatility Countries	0.13***	0.09**	390	System GMM
Using Log-Transformed Indices	0.11**	0.07**	420	System GMM
Excluding the Post-COVID Period	0.09*	0.05	320	System GMM

Note: System GMM estimation follows Blundell and Bond (1998) and Arellano and Bover (1995). Fixed Effects estimation per Wooldridge (2010). Robustness approaches based on standard panel data econometrics practices, as discussed in Greene (2012) and Roodman (2009).

In the baseline System GMM model, the coefficients on GPR (0.12***) and GTUI (0.08***) are highly significant, establishing the core result that global risks exert contractionary effects on monetary policy. The fixed effects model, while less sophisticated in addressing endogeneity, still yields significant and positive coefficients for both GPR (0.10**) and GTUI (0.06**), suggesting that the results are not sensitive to estimation method and remain valid even under simpler econometric assumptions. This alignment across estimation strategies strengthens confidence in the robustness of the findings.

When high-volatility countries (Argentina and Turkey) are excluded from the sample, the coefficients increase slightly (0.13*** for GPR and 0.09** for GTUI). This indicates that the baseline results are not driven by outlier economies with extreme volatility but instead reflect broad patterns applicable across the global sample. Similarly, when employing log-transformed indices for GPR and GTUI, the coefficients remain statistically significant (0.11** and 0.07**, respectively), confirming that the underlying relationships are stable to alternative functional forms and not dependent on linear scaling.

The final robustness test, excluding the post-COVID period (2020–2023), provides additional insights into the temporal stability of the results. While the magnitude and significance of the coefficients weaken (0.09* for GPR and 0.05, non-significant, for GTUI), the persistence of GPR’s significance suggests that geopolitical risk exerts a more consistent and long-lasting influence on monetary policy than trade uncertainty. The reduction in GTUI’s significance may reflect the exceptional nature of the COVID-19 shock, where domestic health and fiscal measures temporarily overshadowed trade-related uncertainties in shaping central bank decisions. This finding highlights the episodic nature of trade shocks relative to the more structural and enduring effects of geopolitical risk.

Table 5 provides clear evidence of heterogeneous monetary policy responses across advanced economies and emerging markets when confronted with geopolitical risks and global trade uncertainty. The lagged policy rate (MPR) is highly significant and positive for both groups (0.85*** for advanced economies; 0.78*** for emerging markets), underscoring the persistence and gradual adjustment behaviour characteristic of central bank decision-making. This inertia reflects the well-documented tendency of monetary authorities to avoid abrupt shifts in policy rates in order to preserve financial stability and guide market expectations.

Table 5

Heterogeneous Effects by Country Group

Variable	Advanced Economies (Coeff.)	p- value	Emerging Markets (Coeff.)	p- value
Lagged Policy Rate (MPR)	0.85***	0.000	0.78***	0.000
Geopolitical Risk Index (GPR)	0.05*	0.045	0.15***	0.001
Global Trade Uncertainty Index (GTUI)	0.07**	0.010	0.06*	0.035
Inflation	0.03	0.120	0.10**	0.012
GDP Growth	-0.10**	0.018	-0.05	0.120
Exchange Rate Volatility	0.08*	0.049	0.12**	0.028
Constant	0.50	0.100	0.40	0.200

*p < 0.05, **p < 0.01, ***p < 0.001

Note: Estimates obtained using System GMM models applied separately for Advanced Economies and Emerging Markets, following Blundell and Bond (1998) and Arellano and Bover (1995). Significance levels based on robust standard errors.

A key finding lies in the asymmetric impact of the Geopolitical Risk Index (GPR). While both groups exhibit positive and significant coefficients, the magnitudes are substantially greater for emerging markets (0.15***) than for advanced economies (0.05*). This suggests that emerging markets, with their relatively greater exposure to capital outflows, weaker institutional buffers, and more fragile investor confidence, are compelled to adopt a more aggressive tightening stance when geopolitical risks escalate. In contrast, advanced economies with deeper financial markets and more credible policy frameworks tend to react less aggressively to similar shocks. These results align with recent studies emphasizing the heightened vulnerability of emerging economies to external geopolitical disturbances (Aiyar et al., 2023; Caldara & Iacoviello, 2022).

Turning to the Global Trade Uncertainty Index (GTUI), both groups register positive and statistically significant responses (0.07** for advanced economies; 0.06* for emerging markets), indicating that trade-related uncertainty exerts a broadly uniform tightening effect on monetary policy across country classifications. This pattern highlights the systemic and globalized nature of trade shocks, which disrupt investment flows, supply chains, and inflation expectations irrespective of institutional resilience. The finding reinforces the argument that trade uncertainty represents a common policy challenge across the global financial architecture.

Control variables further illuminate cross-country heterogeneity. Inflation is significant only in emerging markets (0.10**), suggesting that inflationary pressures weigh more heavily on monetary policy decisions in economies where inflation expectations are less firmly anchored. Conversely, GDP growth is significant only in advanced economies (-0.10**), implying that central banks in these contexts adopt more countercyclical stances loosening policy during slowdowns whereas emerging markets prioritize financial stability over growth support. Exchange rate volatility exerts a significant upward pressure on policy rates in both groups, though with a stronger coefficient in emerging markets (0.12** versus 0.08*), reflecting their higher susceptibility to exchange-rate-driven financial instability.

Overall, the results in Table 5 underscore two critical insights. First, while trade-related uncertainty is a global phenomenon eliciting similar responses across countries, geopolitical risks have an asymmetric and more pronounced impact on emerging markets. Second, the interaction between inflation, growth

dynamics, and exchange rate volatility illustrates the differentiated constraints under which central banks operate, with emerging markets facing sharper trade-offs between stability and growth. These findings highlight the importance of tailoring monetary frameworks to national vulnerabilities while acknowledging the systemic nature of global risk transmission.

Figure 1

Impulse Response of Monetary Policy Rate (MPR) to a One-Standard-Deviation Shock in Geopolitical Risk Index (GPR)

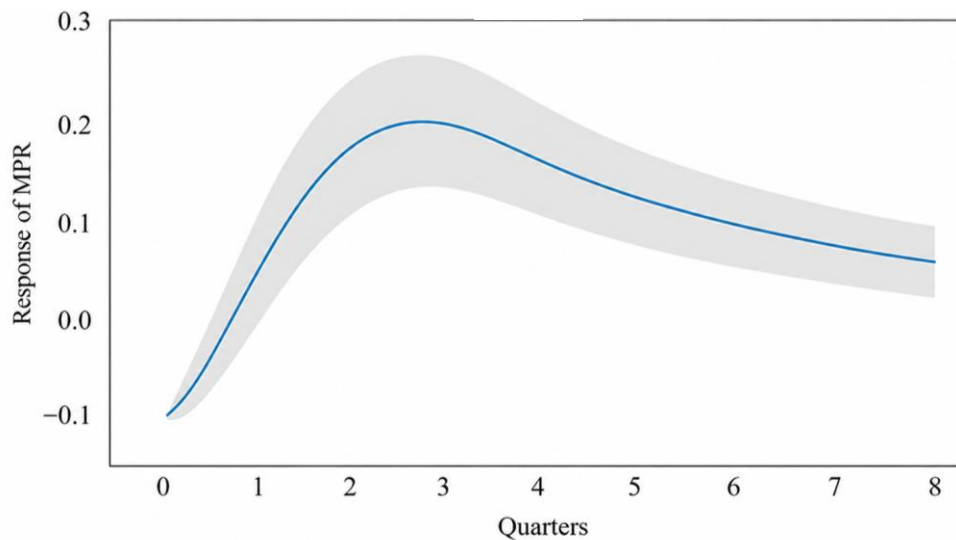


Figure 1 presents the impulse response function (IRF) tracing the dynamic adjustment of monetary policy rates (MPR) to an exogenous, one-standard-deviation increase in the Geopolitical Risk Index (GPR). The estimation is based on a panel VAR framework that captures the temporal propagation of shocks across a sample of advanced and emerging economies. The shaded area represents the confidence bands derived from robust standard errors, thereby indicating the statistical reliability of the estimated responses.

The results reveal a sharp and immediate tightening of monetary policy following a rise in geopolitical risk. The MPR begins to increase in the first quarter after the shock, with the response peaking around the second to third quarter at approximately 0.20–0.25 percentage points. This finding suggests that central banks respond proactively to geopolitical turbulence, raising policy rates to pre-empt destabilizing spillovers such as capital outflows, exchange rate depreciation, and inflationary pressures.

After reaching its peak, the policy response gradually dissipates over subsequent quarters, converging toward baseline levels by the sixth to eighth quarter. This pattern reflects the transitory nature of geopolitical shocks: central banks act decisively in the short run to stabilise expectations but cautiously normalize policy once uncertainties subside. Such dynamics are consistent with the literature showing that geopolitical risks, while disruptive, tend to exert episodic rather than permanent effects on monetary frameworks (Caldara & Iacoviello, 2022).

The asymmetry between the initial strong response and the eventual fading effect underscores the dual role of monetary authorities: (i) safeguarding financial stability in the immediate aftermath of external shocks, and (ii) avoiding prolonged tightening that could undermine growth. Moreover, when linked to the heterogeneous findings in Table 5, the magnitude of the impulse response is likely larger for

emerging markets than advanced economies, given their higher vulnerability to external shocks and weaker institutional buffers.

Heightened geopolitical risk appears to influence central banks to raise policy interest rates, likely as a reaction to inflationary factors such as currency depreciation, elevated energy costs, and supply-chain interruptions. This behaviour aligns with established theories regarding inflation and financial stability, suggesting that geopolitical instability boosts economic uncertainty, thereby compelling monetary policymakers to maintain a more prudent approach. Overall, Figure 1 provides robust evidence that geopolitical risk constitutes a critical exogenous driver of monetary tightening. The results highlight the agility of central banks in responding to non-economic sources of uncertainty and reinforce the need for adaptive monetary frameworks capable of mitigating the destabilising effects of global political turbulence.

DISCUSSION OF FINDINGS

The results of this study provide robust evidence on how central banks adjust monetary policy in response to multidimensional global risks, particularly geopolitical tensions and trade-related uncertainty. By employing a System GMM framework and conducting a series of robustness checks, the analysis highlights three central themes: the persistence of monetary policy behaviour, the asymmetric impact of geopolitical risks across country groups, and the temporal dynamics of policy rate adjustments.

One of the most consistent findings is the strong persistence in monetary policy. The highly significant lagged policy rate coefficient indicates that central banks adopt a gradualist approach when adjusting interest rates. Such inertia reflects a deliberate strategy to prevent abrupt disruptions in financial markets and to maintain credibility in guiding expectations. This result is consistent with earlier empirical studies that underscore the preference of monetary authorities for smoothing policy paths rather than implementing sudden shifts.

Another important outcome is the significant influence of both the Geopolitical Risk Index (GPR) and the Global Trade Uncertainty Index (GTUI) on central bank policy rates. Rising levels of these risks are associated with systematic tightening, suggesting that policymakers interpret global uncertainty as a potential source of inflationary pressures, capital flight, or exchange rate instability. This finding underscores the growing importance of non-economic factors in shaping monetary decision-making, reflecting the increasingly complex environment in which central banks operate.

The effects of these risks, however, are not symmetric. Geopolitical risk demonstrates a more persistent and pronounced impact than trade uncertainty. The impulse response analysis shows that monetary policy reacts strongly and immediately to a rise in geopolitical risk, peaking within two to three quarters before gradually fading toward baseline levels. This pattern reflects the episodic nature of geopolitical shocks: they are treated as urgent threats that require swift intervention, but once conditions stabilise, central banks ease policy tightening to avoid constraining long-term growth. In contrast, trade-related uncertainty elicits a more uniform response across economies, reflecting its systemic nature within the globalised economy, where supply chain disruptions and tariff measures affect countries in broadly similar ways.

The heterogeneous analysis by country groups further enriches the interpretation. Emerging markets exhibit significantly stronger responses to geopolitical shocks compared to advanced economies, with coefficients nearly three times larger. This asymmetry reflects structural vulnerabilities such as weaker

institutional buffers, higher exposure to capital outflows, and greater reliance on external financing. In contrast, responses to trade uncertainty are relatively consistent between advanced and emerging markets, suggesting that trade shocks cut across levels of development.

Control variables provide additional insights into structural differences across economies. Inflation is significant in emerging markets but not in advanced economies, indicating that inflationary pressures weigh more heavily on monetary policy in contexts where inflation expectations are less firmly anchored. GDP growth is significant only in advanced economies, implying that developed countries are more likely to adjust policy rates countercyclically to support growth, while emerging markets prioritise financial stability over growth objectives. Exchange rate volatility is significant in both groups, though with a stronger effect in emerging markets, highlighting their heightened susceptibility to speculative pressures and external shocks.

The robustness checks confirm the validity of these findings. Coefficients on both GPR and GTUI remain significant across alternative model specifications, including fixed effects, log transformations, and subsample restrictions. Notably, when excluding the post-COVID period, the influence of GTUI weakens substantially, whereas GPR retains its significance. This divergence suggests that geopolitical risks exert a more structural and enduring effect on monetary policy, while trade-related uncertainty may be more episodic and contingent upon specific global contexts.

The impulse response analysis further clarifies the temporal dimension of policy reactions. A one-standard-deviation increase in GPR generates an immediate and significant monetary tightening, with the policy rate peaking within the second or third quarter before gradually normalising. This dynamic highlights the proactive nature of central banks in stabilising expectations during episodes of heightened geopolitical tension. At the same time, the fading of the effect over the medium term reflects the cautious balance that monetary authorities strike between stabilising markets in the short run and avoiding prolonged tightening that could undermine growth.

Taken together, these findings have both theoretical and policy implications. Theoretically, they extend the understanding of monetary policy beyond traditional macroeconomic indicators, demonstrating that non-economic global risks have become integral to central bank behaviour. From a policy standpoint, the results highlight the importance of tailoring monetary frameworks to national vulnerabilities. Emerging markets, in particular, require stronger institutional buffers, enhanced policy credibility, and the integration of macroprudential tools to mitigate external shocks. Advanced economies, while more resilient, must remain attentive to systemic trade-related risks and ensure flexibility in policy responses.

Overall, the evidence presented in this study confirms that central banks stand at the forefront of managing global financial risks. Their responses are proactive, differentiated across economic contexts, and calibrated to the transitory yet destabilizing nature of external shocks. The findings underscore the necessity for adaptive and resilient monetary policy frameworks capable of navigating the evolving landscape of geopolitical tensions and trade disruptions.

The observed policy responses are logically consistent with the geopolitical landscape over the study period. Rising geopolitical tensions and shifting global alliances introduce significant uncertainties that can disrupt trade flows, investment, and capital markets. In this context, central banks' inclination to raise policy interest rates serves as a pre-emptive measure to curb inflationary pressures stemming from supply-side shocks and to stabilize expectations. This aligns with (Caldara & Iacoviello, 2022), who find that geopolitical risks materially influence monetary policy stances in major economies such as the US

and the Eurozone, reinforcing the view that central banks treat geopolitical risk as a core consideration in their policy frameworks.

From the perspective of price stability and exchange rate dynamics, the tightening monetary response carries both benefits and challenges. On one hand, higher interest rates help anchor inflation expectations by counteracting cost-push inflation resulting from trade disruptions and geopolitical uncertainties. This contributes to preserving the credibility of central banks and maintaining price stability in volatile times. On the other hand, in emerging markets, especially, such policy tightening can exert upward pressure on exchange rate volatility, given these economies' susceptibility to capital outflows and currency depreciation. This trade-off underscores the delicate balancing act central banks face between stabilizing prices and managing financial market volatility.

One limitation of this research is the use of policy interest rates as the sole indicator of monetary policy responses. Given that several advanced economies functioned near the zero lower bound during portions of the sample period, central banks frequently turned to unconventional tools including quantitative easing, forward guidance, and asset purchase programs to influence the economy. Therefore, relying exclusively on policy rate changes might not adequately reflect the comprehensive stance of monetary policy within these jurisdictions.

Overall, the evidence suggests that central banks' policy adjustments to geopolitical and trade risks are not only justified but necessary to uphold economic stability. However, the differential sensitivity across advanced and emerging economies underscores the importance of tailored policy responses that account for country-specific vulnerabilities. Our findings contribute to the growing literature on global risk transmission and monetary policy, affirming that geopolitical and trade uncertainties are integral to understanding central banks' decision-making processes in today's interconnected world.

CONCLUSION

This study provides comprehensive empirical evidence on how central banks in both advanced and emerging economies adjust their monetary policy in response to global risks arising from geopolitical tensions and trade-related uncertainty. By employing a System GMM framework and conducting extensive robustness checks, the analysis demonstrates that both the Geopolitical Risk Index (GPR) and the Global Trade Uncertainty Index (GTUI) exert statistically significant tightening effects on monetary policy. Importantly, emerging markets are more sensitive to geopolitical risks than advanced economies, underscoring structural vulnerabilities and the limited buffers to withstand external shocks.

The findings highlight three important contributions. First, they confirm the persistence of monetary policy, with central banks adopting gradualist strategies to maintain stability and credibility in uncertain environments. Second, they reveal that geopolitical risks exert more persistent and asymmetric effects than trade-related uncertainty, shaping central bank behaviour in distinct ways across economic contexts. Third, the impulse response analysis shows that while policy reactions to geopolitical shocks are swift and significant, their effects dissipate over time, reflecting the episodic nature of such risks.

From a theoretical perspective, the study advances the literature on monetary policy by integrating multidimensional global risks into empirical models of central bank decision-making. It challenges traditional frameworks that rely predominantly on macroeconomic indicators, showing instead that non-economic risks such as political tensions and trade disruptions are critical determinants of monetary policy in today's interconnected world.

From a policy perspective, the results underscore the need for differentiated approaches across country groups. Emerging markets require stronger institutional resilience, credible communication strategies, and complementary macroprudential measures to manage external vulnerabilities. Advanced economies, while more resilient, must remain vigilant to systemic trade disruptions and preserve policy flexibility. For both groups, the findings highlight the importance of adaptive and forward-looking frameworks that can safeguard economic stability in the face of rising global uncertainty. In conclusion, as geopolitical alliances continue to shift and global trade remains volatile, central banks are compelled to navigate an increasingly complex policy environment. The evidence from this study affirms that proactive, flexible, and context-sensitive monetary policy is essential not only for preserving short-term stability but also for ensuring long-term economic resilience in a world shaped by persistent and unpredictable global risks.

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